

Engineering Optimization

Module:Engineering Optimization

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Assignment 1: Process Model Selection & Optimization

1. Scenario Analysis

Project Characteristics:

Requirement Clarity:

Partially clear. Stakeholders are still refining their needs, so requirements are likely to change.

Risk Level:

Medium to high, due to possible data loss, digital infrastructure limitations, and strict deadlines.

Timelines:

Strict 8-month timeline for a basic working system.

Stakeholder Involvement:

High. Health professionals and Ministry officials need to review and validate system functionality continuously.

Prototype Need:

High demand for early prototypes to validate functionality.

Infrastructure Constraints:

Limited digital infrastructure, especially in rural health centers.

1. Comparison of Software Process Models

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|-----------------|---|--|--|
| Waterfall Model | Simple to manage, structured phases, clear milestones | Not flexible, poor handling of requirement changes, late prototype delivery | Not very suitable – Requirements are changing; Waterfall is rigid. |
| Prototype Model | Early prototype delivery, allows stakeholder feedback, helps clarify requirements | Can lead to incomplete analysis, may increase costs if prototypes are not reused | Suitable – Stakeholders need early prototypes and requirement validation. |
| Agile/Scrum | Flexible to requirement changes, iterative development, frequent stakeholder communication, fast delivery of functional parts | Requires experienced team, may need cultural shift | Highly suitable – Can adapt to changing requirements, provides quick working increments, and allows constant feedback. |

2. Selected Optimized Process Model

Chosen Model: Agile/Scrum

- ❏ Key Takeaway: Agile/Scrum is the best fit for this project due to its adaptability and focus on continuous feedback, which aligns perfectly with the project's evolving requirements and high stakeholder involvement.

3. Justification

Handling Requirement Changes:

Agile allows continuous updates and adjustments, so changing health system needs can be incorporated quickly.

Speed of Prototype Delivery:

Functional prototypes can be delivered in each sprint, enabling early validation by stakeholders.

Risk Management:

Iterative reviews reduce risks of errors, data loss, or poor usability.

Communication with Stakeholders:

Frequent meetings and demonstrations ensure the Ministry and health professionals are involved throughout the process.

Fit with Rwanda's Health System Constraints:

Agile can prioritize essential features first, considering limited infrastructure in rural areas.

Optimization of Cost, Time, and Quality:

By delivering features incrementally, Agile ensures the core system works within the 8-month timeline while controlling cost and improving quality.

- ❏ Key Takeaway: Agile's iterative approach directly addresses the project's challenges, from adapting to changing requirements to managing risks and optimizing resources within a tight timeline and constrained environment.

1. Simple Development Plan

Timeline: 8 months divided into 4 sprints of 2 months each

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|---|---|---|
| Sprint 1: Requirement Gathering & Prototype | Low-fidelity prototype, user stories, basic referral form | Analysts: gather requirements, Developers: create prototype, Testers: test prototype |
| Sprint 2: Core System Development | Patient referral workflow, basic data storage, hospital communication | Developers: code core features, Testers: functional testing, Analysts: gather feedback |
| Sprint 3: Advanced Features | Diagnostic info sharing, notifications, error handling | Developers: implement advanced features, Testers: integration testing, Analysts: refine requirements |
| Sprint 4: Final Testing & Deployment | Complete DPRS, user manual, training plan, deployment | Developers: finalize system, Testers: full system testing, Analysts: coordinate training, Stakeholder demos |

❑ Key Takeaway: This structured sprint plan ensures a systematic development process, delivering tangible results at each stage and maintaining continuous stakeholder engagement for a successful project outcome.